

What is claimed is:

1. A method of controlling a temperature of a plasma chamber wall comprising:
controlling the temperature of a plurality of segments of the wall or other surfaces exposed to the plasma with a plurality of temperature control systems of a first type; and
controlling the temperature of a plurality of segments of the wall or the other surfaces with a plurality of temperature control systems of a second type different from the first type.
2. A method as in claim 1 wherein the second type of control system has a faster thermal response than the first type of control system.
3. A method as in claim 1, wherein the second type of control system has a higher resolution thermal response than the first type of control system.
4. A method as in claim 1 further comprising measuring the temperature of at least a portion of the wall or the other surfaces with the temperature control system of the second type.
5. A method as in claim 1 wherein the temperature control systems of the first type comprise fluid circulation systems.
6. A method as in claim 1 wherein the temperature control systems of the second type comprise thermoelectric devices.
7. A method as in claim 6 further comprising measuring heat flux using the thermoelectric devices.
8. A method as in claim 7 further comprising correlating the measured heat flux to values in a look-up table to obtain an estimated process parameter and;

adjusting at least one of the temperature control systems of a first type and the temperature control systems of a second type based on the estimated process parameter.

9. A method as in claim 8 wherein the process parameter is uniformity.

10. A method as in claim 1 further comprising comparing a measured temperature distribution to values stored in a look-up table to determine process uniformity.

11. A method as in claim 10 wherein the look-up table is provided through a design-of-experiments approach.

12. A method as in claim 1 further comprising:

measuring the temperature of at least a portion of the wall or other surfaces; and

using the measured temperature of the wall or other surfaces to control the temperature control systems.

13. A plasma chamber temperature control, for use with a plasma chamber having a wall or other surfaces exposed to the plasma, comprising:

a plurality of temperature control systems of a first type in thermal communication with the plasma chamber wall or the other surfaces; and

a plurality of temperature control systems of a second type different from the first type disposed in thermal communication with the plasma chamber wall or the other surfaces.

14. A plasma chamber temperature control as in claim 13, wherein the second type of control systems include thermoelectric devices, disposed between at least selected ones of the temperature control systems of the first type and the plasma chamber wall or the other surfaces.

15. A plasma chamber temperature control as in claim 13, wherein the first type of temperature control systems include temperature controlling blocks.

16. A plasma chamber temperature control as in claim 15, wherein the temperature controlling blocks are thermally insulated from each other.

17. A plasma chamber temperature control as in claim 15, wherein each temperature controlling block has a conduit therethrough.

18. A plasma chamber temperature control as in claim 13, further comprising a fluid supply in fluid communication with the temperature control systems of the first type to enable circulation of a fluid therethrough.

19. A plasma chamber temperature control as in claim 18, wherein the temperature control system further comprises a heater to enable heating of the fluid, and a relatively colder fluid supply, and a valve, the valve being selectively operable to allow selective fluid flow from at least one of the fluid supply and the colder fluid supply.

20. A plasma chamber temperature control as in claim 19, wherein the heaters are electrically controllable.

21. A plasma chamber temperature control as in claim 18, wherein the fluid supply further comprises a relatively hotter fluid supply and a relatively colder fluid supply, and a valve, the valve being selectively operable to allow fluid flow from one of the hotter fluid supply and the colder fluid supply.

22. A plasma chamber temperature control as in claim 21, wherein the valve is further selectively operable to allow fluid flow from a combination of the hotter fluid supply and the colder fluid supply.

23. A method of controlling a plasma process comprising:

processing a substrate with a plasma within a plasma chamber having a wall or other surfaces exposed to the plasma;

controlling the temperature of a plurality of segments of the wall or the other surfaces with a plurality of temperature control systems of a first type;

controlling the temperature of a plurality of segments of the wall or the other surfaces with a plurality of temperature control systems of a second type different from the first type;

measuring the temperature of at least a portion of the wall or the other surfaces;

adjusting a parameter of the plasma process by adjusting the temperature control systems.

24. A method as in claim 23, wherein the second type of temperature control systems have a faster thermal response than the first type of temperature control systems.

25. A method as in claim 23, wherein the second type of temperature control systems have a higher resolution thermal response than the first type of temperature control systems.

26. A method as in claim 23, wherein the measuring is performed using at least one of the temperature control systems of the second type.

27. A plasma chamber comprising:

a chamber having a wall or other surfaces exposed to the plasma;

a plurality of temperature controlling blocks disposed in thermal communication with the plasma chamber wall or the other surfaces, each temperature controlling block having a conduit therethrough;

a plurality of thermoelectric devices, disposed between at least selected ones of the temperature controlling blocks and the plasma chamber wall or the other surfaces; and

a fluid supply in fluid communication with the conduits to enable circulation of a fluid therethrough.

28. A plasma chamber as in claim 27, wherein the temperature controlling blocks are thermally insulated from each other.

29. A plasma chamber as in claim 27, wherein the temperature controlling blocks are disposed outside of the plasma chamber.

30. A plasma chamber temperature control, for use with a plasma chamber having a wall or other surfaces exposed to the plasma, comprising:

a plurality of temperature control systems disposed in thermal communication with the plasma chamber wall or the other surfaces, each temperature control system being independently controllable.

31. A method of controlling a plasma process comprising:

independently controlling the temperature of a plurality of segments of the plasma chamber wall or other surfaces exposed to the plasma.